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New Industrial Ventures

THERE can be few established consultants who are not familiar with the client who has " invented " a new process, or a modification of an old one, and desires to obtain the finance wherewithal to exploit his ideas. To be called upon to advise an inventor is perhaps the most thankless task of all because few inventors can ever be induced to believe that there are possible obstacles in the way of the most complete success, if only some one would adventure the necessary capital. Somewhat analogous to this problem is that of the chemical or research department that has devised something novel and seeks to persuade the directors that it should be put into commercial operation. There is, in short, a divergence of outlook in the formulation of new industrial ventures between the technical or scientific man and the commercial man.

The difficulty arises frequently from the insistence on the part of the inventor on purely technical considerations. The question asked of a consultant is generally concerned with the technical prospects of success of the process or machine. The inventor is usually delighted if he can persuade a consultant to give him a satisfactory report on this aspect of the problem, in other words, if he can persuade the consultant that the process " will work." Quite frequently, the consultant has also to assess the cost of operation in order to show that it appears reasonable. It is comparatively rare for most inventors to go beyond this point. It is just here, however, that the real difficulties of the project frequently begin. The financier must ask himself what are the commercial prospects of the venture, what the expenses will be, and what the return is likely to be. At the best he is undertaking a gamble, and he must ascertain that the gamble has a good chance of succeeding; exactly the same considerations must govern the treatment of a proposed new venture by a board of directors. It is clearly essential that the process should be technically and scientifically sound, but that is only one thing to be considered, and sometimes extraneous factors make a decision upon that score unnecessary—to the complete mystification of the inventor, who thereupon complains to the world of the lack of initiative of big business.

The competitive struggle between established materials, processes, machines and so forth, involves competition between a new order and an established order. The established order is threatened by a new process or equipment and consequently is subjected to the combined opposition of all those whose interests lie in the maintenance of the *status quo*. Many processes have been killed by this form of competition due to business policy, and even now in certain large industries there are examples to be seen in which the struggle is going on. Amongst the handicaps may be that of legislative enactment. Mr. Crosby Field in a recent paper on the subject declared that " with the exception of the past 150 years all history presents an unbroken record of legislative enactment stifling technological advance, largely because the writing of the law was placed in the hands of those who would benefit by the maintenance of the present status." It is often not realised that to manufacture is infinitely cheaper and simpler than to sell. The British electrical industry, for example, is finding the truth of that rule. The growth of sales is in form something like that of a summation sign in calculus notation. First there is a period of slowly increasing sales, which may be long or short; then when the product is becoming known and appreciated and can be helped by advertising, there is a short and rapid period of almost vertically increasing demand. Finally there is the last phase in which the curve changes slowly from the vertical to the horizontal, and sales become stationary. It is at this stage that the struggle to maintain output becomes paramount. The immense expense and energy needed to build up a first-class sales organisation is seldom recognised by inventors, and not infrequently a project is turned down, not because it is fundamentally unsound, but because it is unsuitable for the organisation to whom it is offered. Mr. Crossby Field holds that " excepting in the rarest of cases, no new consumer product (i.e., a product sold to the public) is worth financing at all unless the complete distribution plan has been worked out to include by its own agreement one well-established marketing organisation."

One difficulty of the continued march of invention has not been generally recognised, but is a known thorn in the flesh of heads of businesses. It is that by which the continued accretion of small improvements offered to and accepted by different manufacturers causes more people to enter a given line of business than there is profitably room for. Profits under these circumstances soon approach vanishing point and in the end the firms handle the product purely as a means of keeping in touch with their former customers with a view to developing other lines of business with them. Chemical plant manufacturers will recognise in this the fate of all too many " stock " lines. We can call to mind one important plant for which a few years ago there were but half a dozen makers. To-day it is possible for an inquirer to obtain over 20 tenders. Another important difficulty in accepting new ventures is that of the by-products. Generally a chemical process produces by-products, and not infrequently the success or failure of the process is dependent wholly on the market for the by-products.

Notes and Comments

Harvard University

FOR three centuries Harvard University has been building up a reputation which stands now pre-eminent in the United States and very high indeed throughout the world. British scientists and industrialists will join us in congratulating this great university on having attained the mature age of 300 years. A universiy " comes of age," or attains years of discretion at a considerably later period than do its individual students, just what that particular age is, however, remains obscure. Unlike human bodies, however, although Harvard grew up centuries ago, it has not yet ceased to grow—and that adaptability to the needs of each succeeding generation is the sign of a great and live university. This country can take credit for laying the foundations of Harvard by means of a grant of £400 in 1636, and, what is infinitely more valuable, the work and genius of Harvard himself, a graduate of Cambridge University. Its inception was for the purpose of " the advancement of all good literature, arts and sciences and the education of the English and Indian youth."

Science as we know it to-day was non-existent in 1636. The American nation, too, was unknown. How well Harvard built from his meagre and unpretentious beginnings, he did not know. The tercentenary of his university teaches the lesson of how great a tree may grow from a small, well-planted seed, and of how little we may know to what our life's work may lead in after years. The centuries sit lightly on Harvard; no seat of learning pursues more vigorously such a variety of activities. Long may she so continue in the service of the American people and to the enlightenment of the world.

Modern Chemical Nomenclature

UNLESS the greatest circumspection is used, discoveries made in a subject are apt to show themselves in increasingly involved nomenclature. It has long been known that chemistry is peculiarly subject to this disability, a fact that was emphasised by Dr. Clarence Smith earlier in the year in a lecture to the Chemical Society. After ten years' work, the Committee of the International Union of Pure and Applied Chemistry—a body on which 27 nations are represented—appointed to reform the nomenclature has isuued a report. This report has at the time of the lecture not been agreed to by many of the nations affiliated to the Union. It is bad enough in all conscience to remember what all the fancy names given to chemical compounds in inorganic chemistry mean when translated into terms of formulae, but unless there is order in organic chemistry, the result must be chaos. In the paper to which reference has been made, Dr. Smith pleaded the cause of the students of the future. " For them," he said, " the modern craze for brevity in names is storing up trouble. Fifty years hence students will have to learn the empiric names and formulae of, possibly, thousands of compounds, and we could now save them all that mental labour by using systematic names instead of empirical ones. Tetralin and decalin are industrial names, but they have got into scientific literature because the systematic names, tetrahydro- and decahydro-naphthalene involve the trouble of writing a few more letters. Recently I had to deal with the name thioessal, coined more than 50 years ago. You might guess that it is an aldehyde containing the thio radical. You would be wrong. When the compound is named 2:3:4:5-tetraphenyl thiophen, you know what it is and how to write its formula."

Fortunately Dr. Smith does not suggest that we should revise industrial or trade names, but only that scientific names should be systematised. The difficulty of revising trade names is that these substances are articles of commerce used by those who neither know nor care anything of the possible woes of students two generations hence, nor of the organic chemistry of to-day. It might be possible to educate the housewife to ask for phenol when she wanted carbolic acid; it might even be possible to get her to ask for creosol instead, when that name was more correct; but no power on earth would persuade her to say " ortho-anhydrosulphamine-benzoic acid " when she meant saccharine. Yet the fact remains that trade names do persistently find their way into chemical laboratories where everyone understands them and in this way pure chemical nomenclature becomes debased. Even scientific men are not immune from this nomenclature disease. Hosts of other chemical substances are never described, even in chemical literature, by their classified names, so that students still have to memorise their often complex structures.

Currency and World Trade

FINANCE and commerce will take some time to settle down in a world bereft of any precise monetary standard. The gold standard has gone with the French decision to devalue its currency, followed by similar action by the Swiss and the Dutch, and its place has been taken by a system of managed currencies. It is as well to face the fact that the exchanges of the world no longer deserve the name. Exchange implies the freedom of currencies to find their own level, allowing for the play of such economic factors as balanced budgets, and similar aids to credit and confidence. The new money structure which has been suddenly erected is governed by an agreement between the British, United States, and French Governments, to stabilise their currencies in terms of each other by co-operative management based upon huge exchange equalisation funds in the three countries. This device may meet the case for a time, but it cannot lead to a permanent improvement in international trade, which is the world's primary need. Traders in the international field will have to make the best of a very difficult job until their Governments learn wisdom from adversity and give them back the monetary system which they have taken away in the last few years. The most hopeful sign is the clause in the three-Power agreement declaring for the taking of action without delay to relax progressively the present system of quotas and exchange controls with a view to their abolition. Until that programme is realised in its entirety, British importers and exporters will not be able to make their proper contribution to the prosperity of the world.

Accident Prevention in a Chemical Works*

By R. E. TUGMAN, Safety Officer, I.C.I. (Alkali), Ltd.

THE responsibility of the employer to provide safe working conditions for his employees is now being realised more forcibly than ever in the past, and the chemical trade is in the forefront of this movement.

Before attempting to describe the methods which are employed in the group of chemical works in which I act as safety officer it is necessary to explain the basis on which the safety organisation has been built up. First and foremost the management misses no opportunity of demonstrating practically to the employees that it is genuinely and whole-heartedly determined to eliminate or reduce accidents by every reasonable means. Secondly the management uses every endeavour to bring home to every individual worker that not only is accident prevention an obvious benefit to him, but also that carelessness, causing unnecessary damage to himself or his fellow workers, is no less serious an offence than that which causes unnecessary damage to plant or material. Thirdly, safe working is an integral part of efficient production, and that production accompanied by accidents is neither efficient nor economic.

It was realised from the outset that a reduction in the accident rate could only be achieved by a concerted effort by both management and men and that neither section could hope for success without the co-operation of the other. The problem resolved itself into the following divisions:—

(1) Mechanical guarding of machinery, adequate and safe access to plant, improvement of working conditions as regards lighting, ventilation, heating, etc., provision of protective clothing and appliances, adequate instruction and supervision of all workers from a safety point of view, safety propaganda and publicity, insistence on cleanliness and tidiness—all of which are functions of the management.

(2) Elimination of carelessness and observance of works safety rules—which are functions of the employees.

(3) Investigation into accidents and measures to be taken to prevent recurrence—functions of the management in co-operation with the employees.

As regards guarding of machinery, access to plant and other physical methods of accident prevention, engineering committees, consisting of experienced engineers employed by the company, were appointed to draw up safety standards. It is not possible in an article of this nature to describe the area covered by these standards, but the titles of the sections will give some idea of their comprehensiveness: Site and services, buildings and fixtures, railways and haulages, guards for shafting, belting and general plant machinery, belt perches, belt poles, belt fasteners, access to plant, guards for machines, portable electrical apparatus, electrical wiring and cabling, electric motors and switchgear, and miscellaneous electrical equipment.

Fig. 1 — Modern oxygen breathing apparatus can be of a type which is comfortable to wear.

Each section describes the measures which should be taken to provide safe working conditions from its own particular angle, and these standards are rigidly adhered to in all new construction and old plant is brought into line as far as is reasonably practicable. By means of these standards it is not a difficult matter to reduce to a very great extent the risk of injury to the employee who obeys instructions and takes reasonable care.

With regard to protective clothing and appliances, similar action was taken and it has been found possible to standardise equipment to a very large degree.

Safety Appliances

Comfortable and efficient protection from poisonous gases and corrosive liquids offers problems the solution of which often presents considerable difficulty, and although we do not pretend to have reached anything approaching finality we do claim to have advanced considerably. The types of goggles, gloves, breathing apparatus, safety belts, etc., etc., now used by our workers are undoubtedly greatly improved, and we are steadily overcoming their prejudice, which was mainly due to the inefficiency and discomfort of former types.

Fig. 1 shows a modern type of oxygen breathing apparatus which is largely used. This apparatus is handy and comfortable to wear and our men have no hesitation in making use of it when necessary. Fig. 2 shows our latest type of splash-proof goggles. These are light and comfortable, an excellent fit to the face, and they have proved extremely popular with the workers with the result that a substantial

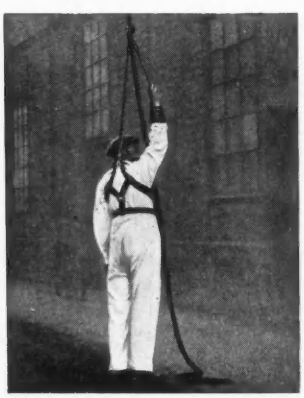

Fig. 3—This newly designed safety belt provides adequate security without causing discomfort to the wearer.

Fig. 2—These splash-proof goggles are light and comfortable and are an excellent fit to the face.

* This article was received too late for inclusion with other Safety First features published in THE CHEMICAL AGE, September 26.

Fig 4—Attractive accident boards with posters, photographs and coloured lights, can be provided to give a detailed record for the works.

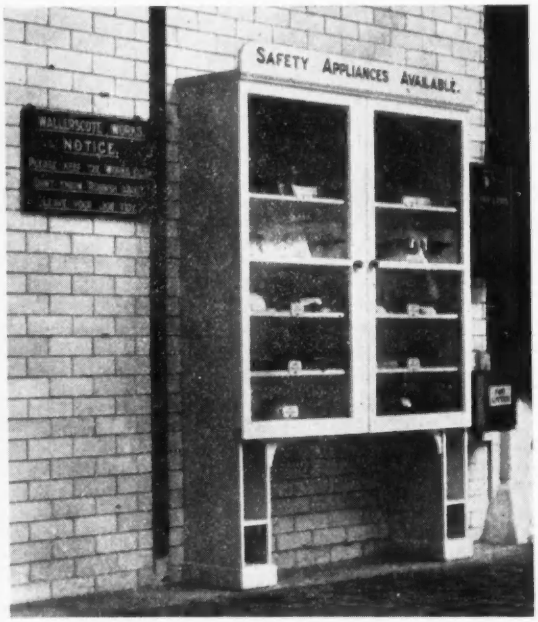

Fig. 5—The display of standard safety appliances in this cabinet shows the workers just what is available for use.

reduction in the number of eye injuries has been achieved. Fig. 3 shows a newly designed safety belt which provides adequate security without causing any discomfort to the wearer, and which enables him to carry out his work without restriction. Fig. 5 shows a cabinet erected at one of our works. This contains the standard articles of safety equipment and shows the workers what is available for their use.

Instruction and supervision of workers in their particular tasks is obviously necessary if safe working is to be expected, and we rely on the co-operation of the foremen to a large degree to provide this. It is perhaps unnecessary to point out that if the foreman takes a keen interest in the elimination of accidents every man in his charge will soon realise the advisability of giving the matter his own personal attention.

The Accident Notice Board

Propaganda and publicity are, in our opinion, matters of vital importance. It is essential to keep the interest of all concerned, and we find that this can only be done by constant and fresh publicity methods. By this I mean that new ideas must frequently be forthcoming to capture the eye of the worker and keep him up to the mark and prevent back sliding. We have therefore erected in each of our works attractive accident boards which give in detail the records for that works. Coloured lights are used to catch the eye, and posters and photographs are freely employed. An illustration of one of these boards is shown in Fig. 4.

We find that photographs have a very special appeal and for this reason we lose no opportunity of pointing a moral by this means. A man will walk past a printed notice without so much as a glance but a protograph proves an irresistible attraction to the majority of workers. The problem of " selling " safety to one's workpeople is very much the same as selling a commodity to the general public. We have found that advertising methods which have proved commercially successful are the methods to employ to put the safety idea across, and we feel that much more advantage could be taken of the advances which have been made in the science of advertising to further the aims of accident prevention to the benefit of employer and employed alike.

We supply to each worker a copy of our safety handbook. This is a booklet in which an attempt has been made to lay down safety rules for the guidance of the ordinary worker. The booklet is drawn up to meet our own particular needs and covers all normal operations carried on in the works. The value of insistence on cleanliness and tidiness cannot in our opinion be over-emphasised. Slackness and carelessness breed freely in dirty and untidy conditions, and it is idle to expect that alertness necessary for the avoidance of accidents in minds which have grown used to slovenly conditions.

Accident investigation naturally plays an important part in our safety organisation and we invite and obtain the co-operation of the employees in this work. We have a works safety committee which meets monthly and inspects the accident records and discusses any matters of interest in connection with safety generally. Monthly visits to sections of the plant are carried out and suggestions for the improvement of safe working conditions are put forward to the management.

Value of Accident Statistics

We do, of course, make every possible use of accident statistics. Every accident, however slight, must be reported and the result of every accident recorded. This enables us to produce statistics which show up our weak points at a glance. It is the fashion nowadays to belittle the value of statistics, but we are firmly of the opinion that without accurate and pertinent statistics we should be working entirely in the dark. It is necessary to emphasise that these statistics must embrace all accidents, however slight, as the degree of injury is often a matter of good fortune or otherwise.

There are other matters in connection with a safety organisation which I can only refer to very briefly. Efficient first aid and medical services are obviously essential, and we make a very special point of impressing on the workers the importance of immediate expert attention of the slightest injury. We have found that by careful study of this problem these services have gained the confidence of the vast majority of employees; they realise their value and the old idea that a scratch is of no consequence is dying a natural death. Our surgeries are equipped with modern facilities, ambulance men are well trained and efficient.

The Stampede of the British Ass to Blackpool's Floodlit Swings and Roundabouts

By PROFESSOR H. E. ARMSTRONG

IT is never too late to mend. By visiting Blackpool, the B.A. has at least subconsciously given proof very late in its career that it may be on the mend—about to come down to the popular level and seek to do a very long neglected duty. It has been flood-lit by the glow of 300,000 lamps, theatrically switched on from Oxenholme. Aladdin had but one, with which he did much—what of the use made by our modern magicians of the many thousand? Have they touched popular imagination?

Sir Josiah Stamp, from the uneasy platform of the Association Swimming Raft—the presidential chair—plunged into the deeps of modern knowledge but only after oiling his skin so that their impact should be very partial. His introduction of the town to his 2,000 odd camp-followers was strangely bare, seeing that his fortunes are so closely wrapped up in it—a poor piece of publicity work. He did little more than mention it in a five-line paragraph, the second in the address:

> "Since the beginning of this century the British Association has, till now, added only one new place of meeting in this country to its list. Blackpool can certainly do for science in the North all that Bournemouth achieved in the South: give our record new vigour and itself a new friend."

Indescribable Attractions

We have here no picture of either place. The meeting at Bournemouth was the last the writer happens to have attended—no more charming spot to retire to could be found; the Bagshots are there at the height of their beauty, Ariel must have invited us to go there in saying, "Come unto these yellow sands"; the glow and glory are irresistible; their texture offers an indescribable attraction to the sensitive touch. In substance—silica, delicately tinged with iron, flood-lit with deeper natural colours in the cliffs across the strait at Alum Bay, next the Needles. Facing the Bournemouth cliffs is the great cretaceous fold of the Isle of Wight; looking at it you seem to see the squeeze coming on from far out to sea, very slowly, hinging up the chalk at the London Clay joint; then to the west, at Swanage, coaxing the chalk itself into a rounded right-angle bend, the imbedded flints, though crushed, showing few if any signs of shearing. Farther west, along a stretch of thirty or more miles, formation follows formation in most entrancing undulating succession, to be seen nowhere else in the world. Modernity comes in as *Queen Mary* liners flit across the field of view.

Blackpool has no such charms—its coastline is all but forbidding; it is a built-up area. Yet man has taken it to himself and made it the favoured resort of millions. Its attractions are artificial; it glories in being artificial, except in its display of unaffected humanity—also of a perfect air coming from the Atlantic.

The Original Object of the Association

What went the Association out to for to do? It is clearly between the Devil and the Deep Sea; the Council can only talk in terms of worn-out Tommyrotics. Several months ago a programme was issued in which attention was called to the original object of the Association:

> . . . *To obtain more general attention for the objects of science, and the removal of any disadvantages of a public kind which may impede its progress.* . . .

A century or more ago when this article was framed original workers lived all but isolated lives. Communication was difficult, publication was difficult; that they should be brought together at times was essential. During the Victorian period the Association did a great work in promoting the interests of scientific students: it is doubtful if it has had the least useful effect upon scientific progress in the interval. The agencies are now almost too numerous. What happens at the Association meetings does not reach the public, except in tit-bit form: the proceedings are not snappy enough to appeal to the average press-man.

The interpretation put by the Council upon the article quoted is belated and is proof of an entire failure to appreciate the situation.

> Having in view these aims, which are among those prescribed for the Association in the first statute adopted on its foundation, the Council, in co-operation with the sections, have considered the growing strength of the public demand for a moresy stematic presentation of selected subjects of scientific investigation in their bearing on the life of the community.
>
> Every item in the programme potentially possesses such a bearing: the results of any scientific research may, immediately or ultimately, affect the public welfare. It is intended, however, to group together in a definite series each year certain communications in which the more immediate public interest will be stressed.

The public does not know what it wants any more than the Council does. It hears enough and sees enough to know that a mighty power has been let loose in the world—it is allowed to use the internal combustion engine to its heart's content and kill with it *ad lib.*; a little more, we shall have open gladiatorial contests upon the roads. The public does not benefit from the contests of astronomers airing their rival speculations. The addresses presented are hashed mutton mostly in these days of over-publication, too much doctored up for the occasion, "over-sacked" with little substance for the most part, there is no need to waste time and money in serving them up with special ceremony. What is patent to all is that modern knowledge is being used too exclusively in the service of commerce and industry—that man has done little to save his soul and that he knows practically nothing of his body: to-day he lives for the most part controlled by unbridled advertisement. I can look back to the introduction of popular education—we have gained knowledge in every direction in the interval but the schools stand unrepentant, without the least regard for scientific method.

No Criteria of Ignorance

The result is we have no criteria of ignorance. If the British Association be continued it must set aside all idea of aiding the progress of knowledge—it must seek to show how knowledge may be used with understanding in social service. The president seems to see this but only dimly—he is in no way clear how we should proceed: nor is anyone else.

Opinions will vary as to quality of the attempt made by Sir Josiah Stamp to set a stamp upon the Association. He was set an impossible task. The lot of the railway magnate in such a position was not a happy one—he had no points of contact with his hearers. He will have chosen his title, we may charitably assume, thinking that he was called upon to play to a gallery tied to the use of the shibboleth *science*—a meaningless word to those who ask that words be given meanings, because it covers immensity itself, a multitude of sins in the public eye so that they are beginning to be fearful of its effects and to regard it as a term of evil interest.

In one of the addresses it is pointed out that J. B. Priestley, the popular writer, gives it this connotation. Had Sir Josiah been content to clarify his title and use the familiar word *knowledge* in place of the ambiguous term *science*, by a stroke of the pen he would have brought himself into touch with the public generally. Moreover, had he spoken of his own experience, laid bare his difficulties, he would have rendered constructive service. We should like to have the railway mind described. At first full of imagination, with time it seems to have lost all imagination, judging from its failure to be civil to its customers and to appreciate the effect of the impact of knowledge—take the advent of the Diesel

engine as an example. As it is, the address was far too long, too discursive, lacking point and of no constructive value.

At the outset, a strange limitation is placed upon the theme implied in the title—*The Impact of Knowledge upon Society*. Impact is not to be taken in its general sense. Sir Josiah deals with it from his industrial point of view and considers the effect of the impact only in so far as new discoveries and inventions are apt to push existing processes and industries aside, causing maybe great displacements of interests and capital The current duel in the gas world is of significance in this connection. He is undoubtedly here dealing with a problem of great social importance: unrestricted and unlimited industrial competition cannot in the long run be maintained. Some curb must be set upon unjustified advertisement. Valuable as the address is on the particular issue concerned, coming as it does from a man of affairs, it does not solve the problem now before the Association—the individual application of the methods of discovery to the population at large with a view to raising intelligence and sanity of judgment. Sir Josiah, strange to say, takes no notice of the revolutionary social movements at work throughout the world, largely resulting in denial of freedom of judgment and of thought. The effect can only be to reduce technical efficiency. We are too little alive to the extent to which we are denied these already—fundamentally, in education.

Never before has the president had the call to turn on so much light or so great an opportunity to direct current. Blackpool is unique and the most remarkable of seaside resorts. Not only does it attract vast numbers of visitors from neighbouring industrial towns, but these are of an exceptionally high order of ability in their class. The 300,000 lamps may give a great light but their mental and moral effect is slight. The Blackpudleian who initiated the idea of inviting the Association took a great step forward. If the Association officials, in deciding to accept it, had had the imagination and intelligence they might have seized the opportunity to give a great lesson to the masses in what has been grandiloquently termed the cultural value of knowledge. Everyone knows to-day what wonderful uses are made of knowledge. What is needed is to bring home to as many as possible the spirit behind knowledge. Upon this progress depends. It cannot much longer be possible for us to go about without eyes, ignorant of ourselves and of the world.

The Association should have arranged to address the masses, to make known in simple terms the nature of scientific endeavour—how it may be extended to ordinary life! It should have been a revival meeting. The president and his lieutenants should have gone about with brass bands and tub-thumped at street corners. The opening meeting should have been held in the theatre. When the curtain went up the president and his supporters should have appeared on a merry-go-round, he on the footplate of an old-style Puffing Billy, most of the others on the animal chosen by the Association—their mounts braying hard. Sir Richard Livingstone alone should have been seen racing gaily around them all, in the smartest coster's cart, in gala rig of A.P.H. Derby Day attire, with all his pearlies on, waving aloft a flag—*On to L.! Excelsior!* The effect would have been electrical throughout the country.

The Education and Training of the Chemical Engineer in Germany*

By A. EUCKEN

THE heavy chemical industry in Germany is not able to dispense with a relatively large staff of first-class chemists and physical chemists and would be justified in fearing a certain loss in the efficiency of these important employees if an attempt was made to give them a supplementary training as engineers instead of setting them an important piece of research for their doctorate as is now customary. Conditions are otherwise with the engineers employed by such concerns. For dealing with a variety of equipment (transport plant, engines, boilers and the like) there is no necessity to stipulate other qualifications for training than obtain at present, but an experienced chemical engineer already trained to deal with problems of materials on a mechanical-technical basis is undoubtedly far more suitable than a mechanical engineer for dealing with the exceptionally important engineering problems met with in actual chemical production.

Any loss in the actual engineering (constructive) capabilities of such chemical engineers by supplementary training in subjects dealing with the properties of materials should be avoided at all costs. In the light of the experimental syllabus instituted at the Technical High School, Karlsruhe, this is perfectly feasible when not only the preliminary engineering training (up to the final diploma examination) has been completely passed according to plan, but also when the latter, following the preliminary examination, is regarded as the foundation for future training. Compared with a course in machine construction itself, the fundamental difference here is that the constructive problems to be tackled are taken from the sphere of chemical apparatus construction and not from that of power machine construction.

It would appear advisable not to end the training of chemical engineers destined for the heavy chemical industry with the diploma examination, but to widen and deepen their knowledge by setting them to work for the Doctor of Engineering degree, be it in an institute for chemical plant or in a chemical or physico-chemical institute. For only in the course of such work will they really find opportunity of prosecuting the study of problems of their field with all the thoroughness attainable by modern research methods.

An even more objective reason can be advanced for recommending the acquirement of a Doctor of Engineering degree for chemical engineers in the heavy chemical industry. Without this qualification their position would not be a secure one in comparison with their chemical and physico-chemical collaborators who will almost invariably have reached the doctorate standard. It remains to be added that chemical engineers trained on a physico-technical basis could probably equip themselves with equal success to problems of process control for which up till now technical physicists have been generally selected.

The industry of chemical plant construction requires chemical engineers first and foremost; this point needs no stressing. The same remarks apply to the subsidiary industries making refrigerators and the like. Incidentally, as experience shows, the larger firms making chemical plant cannot afford to be content with limiting themselves to chemical engineers, for it has been found highly desirable to reinforce the latter with a number of physico-chemists and pure chemists.

Another conclusion is reached when a correct view is taken of the requirements of smaller chemical works, some of which may employ only one single graduate. It will then fall to

* From a paper presented at the Chemical Engineering Congress, London, June, 1935.

the lot of the latter to carry out chemical work both in the laboratory and the factory, whilst it will be urgently necessary that he should supervise plant and machines, locate faults and put them right if need be, and act as buyer of new plant. In agreement with H. Lindner, a good physico-chemical training seems to be the most suitable in such cases, together with a supplementary course in engineering and also, where possible, training in economics and insurance. We need not discuss whether this suppementary training should be undertaken before or after the final degree examination; there are certainly definite advantages in first completing the complete course in chemistry up to the degree examination.

As to whether chemical engineers or engineer-chemists are better qualified for positions in other manufacturing industries, it is not yet possible to express a general opinion. But since the conditions will most frequently resemble those in smaller chemical works, there will probably be more scope for engineer chemists. In a whole series of important industries, however, chemical engineers enter into consideration almost exclusively.

Twenty-Five Years Service to the British Gas Industry

Sir Francis Goodenough Retires from the B.C.G.A.

FOLLOWING the annual conference of the British Commercial Gas Association in Bath, October 3-6, Sir Francis Goodenough will retire from the post of executive chairman of the Association, having held office since the Association was set up (1911) to represent the commercial interests of the whole British gas industry.

To most people Sir Francis Goodenough is known not only as a gas administrator but as an authority on economic questions, and particularly on the problem of distribution. He started life in a gas company's office. Here he found himself a member of an industry which had brought its productive system to a high point of efficiency, but which hardly realised the spectacular possibilities of increasing its business by modern methods of selling. It was a concession to new ideas when Mr. F. W. Goodenough, in his early thirties, was put in charge of the gas sales department of the Gas Light and Coke Company, the largest gas undertaking in the world. In this position he made many reforms. He took a census of the company's district to gauge its possibilities, trained a special body of salesmen, engaged women experts in domestic science to demonstrate the use of gas appliances, and advertised the company's service in the newspapers.

Sir Francis Goodenough.

Many of the newspapers and magazines in which Mr. Goodenough advertised on behalf of the Gas Light and Coke Company were read by gas consumers all over the country. In consequence, many other gas undertakings and gas appliance makers benefited from the company's advertising. Some actually offered to bear part of the cost. This suggested the idea that a national scheme of advertising might be floaed, with contributions from gas undertakings and makers of appliances all over the country. In the discussions which followed, it became clear that there was need for a strong central body to co-ordinate other common activities besides direct advertising. The result was the foundation in 1911 of the British Commercial Gas Association.

Sir Francis was a leading figure at the first Conference in Manchester and Salford. He organised the National Gas Exhibition of 1913, which was opened by the Lord Mayor of London. It was a picturesque event which drew big crowds and focussed attention on the new Association. The war, however, was a testing time for the B.C.G.A., then barely three years old, but the Association emerged stronger than ever, with an increased membership and a bigger revenue.

In the course of these developments, Mr. Goodenough (as he was then) had become a well-known public figure. He was invited to represent the gas industry at profession conferences, on official committees, and on the councils of important social movements. It was recognised that this close personal contact with influential groups was in the highest interests of the gas industry. At the same time his ideas on advertising and on education for business attracted much attention. He became chairman for two years and subsequently for eight years president of the Incorporated Sales Managers' Association, and for three years president of the Incorporated Society of British Advertisers.

His strongest personal interest outside gas was, and still is, in educational questions. He formulated general ideas on education for business and became the leader of those who were pressing for an improvement in the national system of commercial training in the light of new economic conditions. In 1928, when the Government announced its Committee on Education for Salesmanship, it was natural that Mr. Goodenough should be appointed chairman. The committee included some of the foremost figures in British industry and commerce. It published three detailed reports between 1929 and 1931, and its recommendations have had a powerful influence on the development of commercial education. In 1930 its chairman was knighted as Sir Francis Goodenough; he had previously been created a C.B.E. in 1926.

In 1931 Sir Francis retired from the position of controller of gas sales at the Gas Light and Coke Company. He had entered its service as a boy in 1888. In a dozen years he had worked his way from the ranks to a key position in the world's greatest gas company. He was, however, pressed to remain chairman of the British Commercial Gas Association, which was then being reorganised owing to changes of personnel. He had been its mainspring for twenty years. Freed from departmental routine, he was glad to devote his whole time to developing the Association. He was particularly anxious to see the scheme of commercial education successfully launched. The ideas which he expressed thirty years ago had been translated into fact. Now, when the Association celebrates its twenty-fifth year, he is retiring from its service.

THE principal feature of the British import trade in fertilisers during early 1936 was the gain in phosphate rock. British exports of ammonium sulphate continued the downward trend. Whereas in early 1934, 60 per cent. of shipments were designed to British countries, in 1936 the British countries accounted for 83 per cent.

Letters to the Editor

"Washing the Boss's Dog"

SIR,—Your report of Professor Philip's address to the Chemistry Section of the British Association on "Training the Chemist for the Service of the Community" (THE CHEMICAL AGE, September 12), gives rise to some mixed feelings. One cannot but appreciate his kind reference to "the general practitioners of the profession" and his criticism of the many examples of industries "depending essentially on the successful operation of chemical or physico-chemical processes controlled by a board of directors selected solely by virtue of their financial qualifications."

It is in the final paragraph of the report that one finds matter for dispute. Professor Philip goes on to say, "If chemists feel that the fundamental and widespread part which their science now plays in the community is not sufficiently realised and if they consider that their profession should have greater influence in commercial, industrial and national affairs the remedy lies, to some extent, with themselves both individually and collectively."

Let us examine the position in so far as it concerns the chemist in industry. What chance has he of finding this "remedy"? What hope has he of "getting somewhere"?

Firstly, he can do little individually. Take my own typical case. I have been at my job for a dozen years or more. If the demand for chemists ever exceeds the supply I might get another job, but who wants to sell a house, move a family to another district and "cut one's losses"? Moreover there is a danger in box numbers and my employers might be able to close nearly every door in their particular industry. So I just "stay put," spin out a small salary and hope that one day a bright light may illuminate the darkness of the directorial brain.

Secondly, he can do nothing collectively because the profession is such a medley of different types of chemist, belonging to different societies and associations and in such widely varying positions in industry that there is no single strong "trade union" behind the individual in his struggles. (It is not our intention to enlarge upon this semi-political theme.)

Let us consider the matter again. Why does the proficient chemist not get promotion? (Experience shows us that not more than one in every ten cases of promotion is a clear case of recognition of merit.) Some points occur to us which may have figured in an earlier contribution

(1) The output of reliable analysis is a major consideration. The attitude to the bench chemist is either "He's a good chemist—keep him at it," or else "He's a poor chemist—find him a manager's job!"

(2) The ramifications of big business are legion and the orders of G.H.Q. over-rule the claims of the man on the spot. (Oh, why were the brothers and sisters of "big business" men so prolific?)

(3) The "trainee" system. A steady stream of young fellows from the universities come in for a short comprehensivt study of the business. These "star-selections" for success have every facility for that wide experience denied to the "back" chemist. In the end they are neither good chemists, good engineers, good accountants or good salesmen. They just have no foundation. The chemist who could benefit by such schooling is persistently overlooked.

(4) The class barrier is being raised. Management is being entrusted not to the best brains but to the so-called "right" people (and it seems that the public schools and universities have a remarkably high output of mediocrity and rank incompetence). The middle classes are being alienated and turned into dis-spirited wave-slaves. (Another political theme upon which we will not embark.)

(5) In desperation many men—deserving and undeserving cases—are daily attempting to beg, bluff, "brow-beat" or "blue-eye" their way into a better job (hence my title). This can be a degrading and disgusting traffic.

On some of these points the words of Mr. St. John Ervine on "The Unpopularity of Technical Skill ("Observer," September 20) may be of interest:—"It is, I suppose, difficult for a young gentleman from Oxford or Cambridge to realise that he has just left school, that he is in fact a rather oldish schoolboy and that from the point of view of an employer he is just about fit to lick stamps and copy letters. His superior education may make him quick in the uptake and enable him to rise rapidly to positions of greater responsibility than that of an office-boy, but that rapidity will not be so great as he supposes and his stores of knowledge will have to be supplemented by some experience of affairs and people." I will not quarrel with that verdict although that "quickness in the uptake" seems a trifle flattering.

The trained chemist is with us in abundance. He has bought his training dearly with years of study and the comparative drudgery of the laboratory bench. What he needs, I contend, is an incentive, the sure knowledge of an opportunity of application. There are not enough good jobs for everyone, but let the best men have them and stop this plague of "Yes-Men" and wearers of the Old School Tie.

Surely we ought to have some system of semi-automatic promotion giving the bench chemist his "chance" and affording the trainee, the man from Oxford, the bit of grounding in fundamentals, the taste of hard "slogging" which will adjust his false idea of his capabilities and importance in the world and enable him to become some day a useful member of the industry.

I make the industry a present of the following Points System for selecting candidates for promotion, with a required minimum score of (say) 75 points:—

Quality.	Points.	Remarks.
Proved ability	50	The bed-rock of a man's worth and character. Full points to require speed, efficiency and initiative.
Good conduct	10	Evidence of trustworthiness.
Long service	15	One point per year up to fifteen. Three years to be a minimum.
Degrees	10	Slight indication of an ability to "rise to the occasion."
Background	10	Too often found in the foreground. Membership of golf clubs, lodges, etc., etc.
Personality	5	That "something" the others haven't got.

With my apologies for my regrets that I am forced to hide behind a pseudonym which served me on a previous occasion.
—Yours faithfully,

"EXTERNAL GRADUATE."

Standardised Red Lead for Paint

THE British Standards Institution have just issued a revision of Specification No. 217, Red Lead for Paints, which has now been extended so as to include non-setting red lead which was originally the subject of No. 315. It is hoped that by including the three types of red lead in one publication, the specification will be more serviceable to industry. In the revision of the specifications the technical requirements have not been altered to any material extent except that in the case of non-setting red lead the limit for the coarse particles has been reduced from 1.0 per cent. to 0.75 per cent. The clauses have, however, been reworded and the methods of test modified to be brought into line with the standard methods now adopted. Copies of Specification No. 217-1936 may be obtained from Publications Department, British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 2d. post free.

Urea–Formaldehyde Synthetic Resins

By A. E. WILLIAMS, F.C.S.

THERE are now two chief methods in use for the commercial production of urea. In one of these methods ammonium carbamate is the raw material; by heating this under carefully controlled conditions of temperature and pressure it decomposes into water and urea. The other method makes use of calcium cyanamide, which is hydrolysed to produce lime and urea; the lime being afterwards precipitated with CO_2 at about 30° C. and the carbonate removed by filtration. This latter method has led to the discovery that it is possible to make urea resins direct from the cyanamide by reaction with formaldehyde. Briefly, the process consists of boiling powdered calcium cyanamide in water until a strong solution is formed. A period of settling then follows to bring down all insoluble matter. The clear solution—consisting principally of cyanamide, di-cyanamide, urea and calcium carbamate—is next agitated in the cold with either acetic or phosphoric acid to precipitate further impurities, when it is strengthened by evaporation before condensing with formaldehyde. Generally, however, the resins produced in this process are inferior to those resulting from urea itself; and as a consequence modern developments are mostly concerned with resins of the later class.

Varieties of Urea Resin

The widely varying characteristics and properties of urea resins found in commerce are due to different catalysts or condensing agents employed in the condensation process, and also to the relative proportions of urea-formaldehyde employed. The simplest resinous material of this character is prepared by boiling together one part of urea with four parts of formaldehyde without any condensing agent, which produces a weak aqueous solution of the resin. After concentration to a thick viscosity this solution may be used direct as an adhesive. Upon drying the solution at 100° C., however, the solid mass obtained becomes insoluble in water, but is only with difficulty rendered infusible and suitable for use in moulding. If the above proportions of urea and formaldehyde are boiled together in the presence of a little acid, such as acetic or formic acid, the primary product obtained is methylene urea ($C_2H_4ON_2$), which lends itself readily to polymerisation processes. A resin produced in this manner may be used in varnish manufacture; or, with a filler, for moulding purposes.

When the acetic or formic acid is replaced by carbolic acid (phenol) the resulting resin is of special value for transparent varnish making, and in an appropriate solvent gives a film both lasting and durable. The condensation of urea with acrolein also gives a material of value in both varnish and adhesives manufacture, but the difficulty of obtaining cheap acrolein hinders the development of the product commercially. Because of this, investigations are being made with acrolein production from the oil and fat glycerides in the spent carbons and earths of oil refineries.

Basic Condensing Agents

If urea is heated with 8 to 10 parts of formaldehyde the chief product formed has the composition $C_{14}H_{16}N_6O_7$ and is of little value for either varnish making or moulding purposes. In the presence of a small proportion of a mineral acid, such as hydrochloric acid, however, an insoluble and nearly colourless precipitate is formed, having the formula $C_5H_{10}N_4O_3$, which is inert to many chemical substances and from which may be prepared varnishes of special value, owing to their high dielectric strength, in the electrical industries. This illustrates the effect of an acid condensing agent on the composition of the primary condensation product.

In an alkaline basic medium, such as ammonia, calcium hydroxide, etc., urea and formaldehyde give, in the first place, a mixture of monomethylol-urea ($HO.CH_2.NH.CO.NH_2$) and dimethylol-urea, ($HO.CH_2NH.CO.NH.CH_2OH$), the proportions of these depending on the temperature of reaction as well as upon the percentage of urea and formaldehyde used. These two compounds are capable of further condensation and polymerisation.

In practice these basic condensing agents are generally found to be the most suitable because they facilitate the formation of the methylol ureas without excessive liberation of water which has to be cleared at a later stage. For the production of a resin of this type, as generally used for moulding purposes, one part of urea is boiled with 8 to 10 parts of 40 per cent. formaldehyde, and from 1 to 2 per cent. of calcium hydroxide in aqueous solution for 1 to 2 hours and until a colourless clear solution is obtained. To this solution is added about ½ per cent. of the hydrogenated solvent hexaline, which acts as a homogeniser and to prevent premature gelatinisation of the solution during its subsequent concentration. The bulk of the water is next removed by evaporation of the solution under a high vacuum and at a temperature as low as possible. This concentration of the solution may conveniently be performed in two stages, the first in a film evaporator and the second in a vacuum pan. A thick liquor is obtained at the end of the first stage which is usually on the acid side. When acidity is present it must be exactly neutralised by agitating the liquor with ammonia or a strong lime solution. Salt is next added to bring down colloidal and insoluble matter present, after which the liquor is allowed to settle at least several hours before the final evaporation. This may be carried on until a concentration of 70 to 80 per cent. is obtained, which gives a thick liquor while hot and a semi-solid mass when cooled down. The mass is then loaded with fillers, and/or combined with other resins before moulding; alternatively, it may be moulded and hardened alone, in which case the temperatures under 100° C. are the most suitable.

Organic Glass

When the resin is moulded and hardened without fillers or other additions the moulded product varies from a semi-transparent to a practically clear glassy material. The cloudy mottled varieties are much in use for cheap jewellery manufacture, and fine imitations of opal stones are now made from these. Filled resins are converted by moulding to the multitudinous uses to which the more familiar bakelite class of resin in applied. Specially clear varieties of the unfilled resin, when moulded, are now known as "organic glass."

The raw materials used for this must be free from iron, because even 0.1 per cent. of iron oxide is sufficient to discolour the material. For this reason the various processes of manufacture must be carried out in non-ferrous vessels. To a certain extent the tendency to a yellow colour in the resin is counteracted by adding a small percentage of copper sulphate if the finished material is for non-electrical purposes. The presence of a few per cent. of water in the resin facilitates the homogeneity of the material containing this copper colouring agent. Blue aniline dyes are also being experimented with to conceal the yellow, and as this does not appreciably reduce the insulating value of the product it is preferable for electrical work.

For the successful production of organic glass the chief essentials are a good quality urea, and formaldehyde with practically no acidity present. Also the period of reaction between the urea, formaldehyde and lime must not be unduly prolonged otherwise there is a tendency to the formation of sugars (formose) through the polymerisation of the formaldehyde by the lime. These sugars, while not greatly affecting the transparency of the finished product, impart brittleness to it. Brittleness also often results from the presence of traces of insoluble impurities. To obviate this disadvantage

the liquor is sometimes filtered after neutralising, salting out and settling, and before the final concentration in the evaporator.

The manufacture of organic glass is still relatively undeveloped, and at present it is definitely inferior to glass in many respects. At the same time it has many advantages not possessed by glass. Its weight is approximately only half that of glass, this feature alone makes it valuable for use in modern aircraft; in addition, it does not splinter if struck by a bullet or shell fragments. Its hardness is much lower than glass, and it is also more vulnerable to the action of corrosive agents; although weak acids, alkalies or ethyl alcohol do not greatly affect it. Strong mineral acids disintegrate its surface, destroying its transparency and ultimately its structure. The tensile strength of organic glass is about 140 lb. per sq. in., and compression resistance approximately 14 tons per sq. in. Another great advantage is that the material can be easily machined or bored and does not readily chip or fracture in the process.

Fusible Resins

The fusible variety of urea-formaldehyde resins, *i.e.*, those which have not been hardened by heat, are often marketed as thick viscous aqueous solutions containing a stabiliser, generally an alkaline base. This solution is much used in the decorating and building trades as a priming coat for plaster and wood surfaces; and also in the textile industries for size-making and water-proofing fabrics. Varnishes of value in the electrical industries for the coating of paper and fabric insulation, as well as oil- and spirit-varnishes of the usual type are prepared by evaporating the aqueous viscous solution and finally vacuum-drying the product until the water content is reduced to only a few per cent. The temperature during these concentrating and drying processes should not exceed 70° C., because a higher temperature hardens the product and renders it insoluble in most solvents. The resin thus obtained has a pale brown colour and may be dissolved in linseed oil, turpentine oil, or with greater facility in one of the newer solvents, such as hexalin, in admixture with linseed oil. In the presence of hexalin the resin is readily miscible with ethyl alcohol for the making of a spirit varnish, but ethyl alcohol alone does not dissolve the resin to any appreciable extent.

Owing to the high insulating value of the acid-produced resins these are more popular in the electrical trades than the products made with a basic condensing agent. One of the latest uses for the acid-produced resin is in the making of magnet cores, in which the resin is used as a binder for finely divided iron, produced by the thermal decomposition of iron carbonyl.

World Power Conference

Election of New President and Chairmen

THE office of president of the World Power Conference has been assumed by Mr. William F. Durand, chairman of the Third World Power Conference, in accordance with the constitution which states that the country in which a plenary meeting is held shall appoint the president, to serve till the next plenary meeting.

Sir Harold Hartley, F.R.S., has been re-elected chairman of the International Executive Council to hold office until the next plenary meeting, and the following have been elected vice-chairmen, to hold office for three years: Mr. O. C. Merrill (United States), director of Third World Power Conference; Mr. G. J. T. Bakker (Netherlands), chairman of the Netherlands National Committee; Dr. M. Kamo (Japan), Professor, Faculty of Engineering, Tokyo Imperial University, and chairman of the Japanese National Committee.

The Second Chemical Engineering Congress of the World Power Conference will be held in Berlin in 1940 by invitation of the German National Committee.

Molecular Structure of Water

A New Conception of German Origin

POSITIVE evidence that water is more like a diamond than it is like steam in its molecular pattern was presented by Professor Peter Debye, of the University of Berlin, at a symposium on dielectric properties of matter at the 92nd meeting of the American Chemical Society at Pittsburg last month.

Using the dielectric constant of liquids, Professor Debye has been able to show that molecules of liquids possess definite arrangements of solids rather than the haphazard structure of gases. Molecules of a gas have no more arrangement than a swarm of gnats in the sun, he pointed out. The conception of liquids as condensed gases has implied that liquids were similarly unorganised groups of molecules. "We are just beginning to know what water is, although we have called it H_2O for more than a century," said the Professor. "Altering the historic conception, chemistry is now showing that liquid water consists of groups of molecules of this formula placed in nearly as orderly a grouping as molecules in crystals. We know a great deal about gases and about the solid crystals, but we are only beginning to learn about what liquids are. The old definition of a liquid is that it is condensed from a gas and hence we had presumed that liquids closely resembled gases."

Recent studies using the dielectric constant and other properties of liquids have demonstrated that actually the molecules in liquids are arranged in more or less definite patterns which are characteristic of solids and which are totally absent in gases. The mutual effects of the many molecules existing close together in liquids are nearly as great as those in solids and are much larger than those in gases.

The dielectric constant defines the behaviour of a material in an electric field. It is similar in some ways to resistance in a system through which a minimum current flows. It is one of the methods, of which there are many, by which the nature of liquids is being learned. The dielectric constant for water calculated from its properties as steam is five times as great as the value determined by experiment. Similarly, the calculation of the double refraction of certain liquids from a knowledge of their behaviour as gases gives a result which is as much as 3,500 times larger than that found by experiment. These facts are used to prove that liquids possess a quasi-crystalline structure.

Red Oxide of Iron

Revised Standard Specification for Paint Uses

THE British Standards Institution have just issued a revision of Specification No. 272-1936, for Red Oxides of Iron for Paints, and with it is included a revision of Specification No. 305 for Manufactured Red Oxides together with a new specification (No. 694), which provides for Blended Red Oxides of Iron consisting of a mixture of the natural and manufactured oxides. The specification for manufactured oxides has been amplified to provide for two types, (a) Indian and Turkey reds, and (b) other manufactured oxides, such as that produced from bauxite.

In issuing these three specifications in one cover the Institution is following through the policy which has been adopted in the revision of the series of British Standard Specifications for paints, pigments and paint material now in hand whereby similar specifications are issued in one volume so as to make them more serviceable to industry. In general the technical requirements of the revised specifications are not materially different from those of the original specifications. The wording of the clauses and methods of test, however, have been remodelled so as to be in keeping with the standard form now being adopted. Copies may be obtained from Publications Department of the British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 2d post free.

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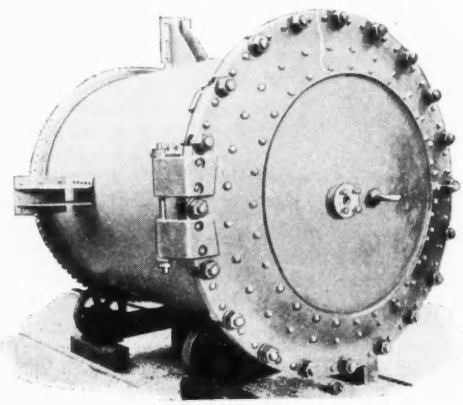

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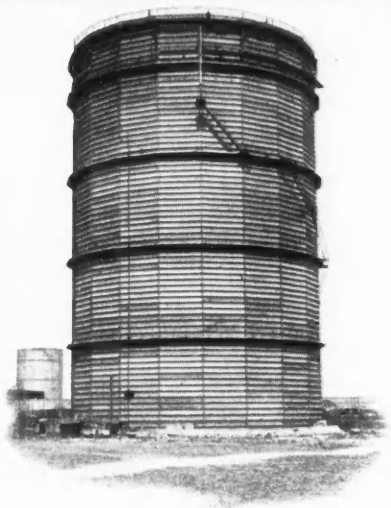

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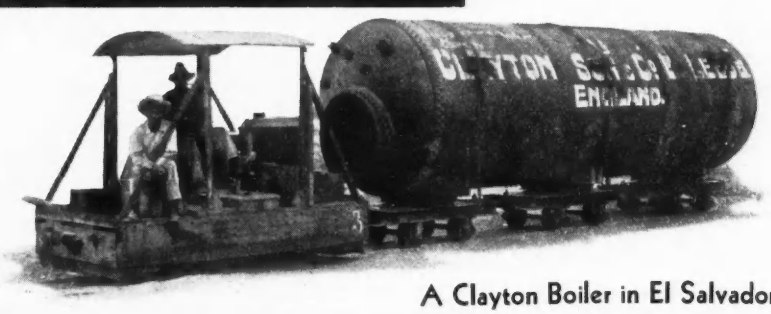

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Smoke Abatement

An Exhibition at the Science Museum

THE smoke problem, which has existed in this country since coal first began to be used, is due to the fact that raw coal, when burned in open grates, does not burn away completely into gaseous materials but emits a characteristic "smoke" containing finely divided particles composed of carbon and tarry matter, impregnated with sulphur acids. A surprisingly large proportion of the coal is thus discharged into the atmosphere, and there is a considerable waste of fuel which, instead of being burned and evolving heat, pollutes the atmosphere and causes damage to the objects on which it eventually settles.

The National Smoke Abatement Society of Great Britain, with the co-operation of interested Government Departments and industrial associations, has organised a special exhibition which was opened by the Minister of Health, Sir Kngsley Wood, M.P., on Thursday, and will remain on view to the public at the Science Museum, South Kensington, London, S.W., until October 31. The exhibition is intended to illustrate the nature and effects of the pollution of the atmosphere by coal smoke, and the scientific means now available for measuring the pollution and for reducing it.

Destructive Effects of Smoke

A series of striking photographs, some of them taken from the air, brings home to the visitor the amount of smoke daily being discharged into our atmosphere from domestic fires and industrial chimneys. The destructive effects of the smoke upon vegetation, stonework and metals is illustrated by numerous specimens which have undergone attack, while a grim reminder of the effect upon human beings is given by examples of polluted lungs and diagrams showing the effect of a severe fog in raising the death-rate in a smoky industrial town. The way in which ultra-violet light, essential to health, is cut off by the smoke pall is also graphically shown.

Turning now to a more cheerful side of the picture, the exhibition shows how much is now being done with the aid of applied science to reduce the smoke nuisance. It is now, in fact, possible in various ways to burn coal completely away, either directly or in several stages, without any wastage of fuel or atmospheric pollution. The methods employed by large-scale coal-users and by smaller domestic users are somewhat different and the "abatement" section of the exhibition is therefore divided into two parts, one dealing with the methods available for the large-scale user, with special reference to boilers for producing steam, and the other illustrating how domestic heating of all types can be carried out smokelessly.

Fuel-Oil Industries

In the domestic section, exhibits have been provided by the electrical, gas, coke and fuel-oil industries as well as by the distributors of natural and artificial smokeless coals, while a small group of model houses shows how these smokeless heating appliances can be installed in a typical house.

The scientific aspect of smoke abatement is well represented by exhibits showing the methods of investigating the products of combustion of various fuels, the measurement of the various constituents of polluted atmospheres, and the general survey of pollution which is being carried out with the co-operation of local authorities throughout the country. A guide to the exhibition (price 6d.) contains a description of the exhibits in catalogue form, and a series of articles on the most important aspects of the question.

The annual conference of the National Smoke Abatement Society will be held at the Science Museum, October 14-17, and will be opened by Captain Harry Crookshank, M.P., Secretary for Mines. Particulars of this conference may be obtained from the Secretary of the Smoke Abatement Society, 36 King Street, Manchester, 2.

Sulphur Recovery in Finland

Plant Designed by Imperial Chemical Industries

WORKING in connection with the Autokumpo O. Y. smelter in Finland, there is a sulphur dioxide plant designed by Imperial Chemical Industries, Ltd. The capacity of the plant is 50 metric tons of liquid sulphur dioxide per day. Sulphur dioxide is obtained in the following manner: The gases originating in the electric smelter and the copper converters are piped to the gas cleaning building, where solid particles are removed. This gas, being cleaned and chilled in the process, is then supplied to the sulphur dioxide plant, where the sulphur dioxide is absorbed in an aluminium sulphate solution, the residue gas being permitted to escape into the air. When the aluminium sulphate solution is heated by steam, sulphur dioxide gas evaporates, is then dried by a strong sulphuric acid, and compressed into liquid form, which is thereupon pumped into tank cars for delivery to the cellulose factories.

Hitherto the Outokumpo O. Y. has sold its sulphur concentrates to the local cellulose factories and to the Finnish Government's Rikkihappotehdas (sulphuric acid factory) in Lappeenranta, which have recovered the sulphur from the concentrates. Copper concentrates had been exported, inasmuch as there was not a factory in the country to carry out the refining process. The Imatra smelter is expected to yield 60,000 metric tons of sulphur annually. There will be 45,000 metric tons of sulphur from pyrite concentrates, 7,500 tons of sulphur from copper concentrates, and 7,500 tons of sulphur in the liquid sulphur dioxide. This production is calculated to supply approximately two-thirds of the sulphur consumption in Finland.

Technical College Equipment

A Forthcoming Exhibition in London

ACCORDING to "Nature" an Advisory Committee on Technical College Equipment at British Industries House, London, W.1, have issued a memorandum on a scheme in progress for setting up an exhibition showing the equipment necessary for technical institutions. This movement is designed to help those responsible for expenditure on these centres in view of the very large outlay anticipated during the next few years by the Board of Education. The Committee represents the three associations concerned with technical teaching and also the Institution of Production Engineers, and is an authoritative body. It is pointed out that the present method of deciding on a design, that of visiting recent buildings and utilising the composite information obtained, wastes time and is unsatisfactory.

Technical education in Great Britain is lamentably behind that on the Continent in the matter of material equipment and buildings, hence this scheme is to be commended. The relationships of the pieces of mechanism will no doubt be an important part of the Committee's work, though this must be to some extent subservient to the configuration of the floor space at British Industries House. Still more difficult will be the presentation of the structural features and service supplies essential as the basis of the equipment, but it is stated that the object of the exhibition is to enable full information to be obtained for getting out estimates for building, extending, and equipping institutions.

CHILEAN interest in increasing sulphur production and exports has brought forward the suggestion that a centralised organisation for sales should be created. As far as can be ascertained this suggestion has not yet taken form. The thought is that the sales corporation should function along the lines of the Nitrate and Iodine Sales Corporation, that by so doing any duplication would be avoided, costs would be kept at a minimum and foreign markets could better be served.

Chemical Notes from Foreign Sources

Belgium

RABBIT SKINS ARE NOW AN IMPORTANT SOURCE of glue which is extracted from the pelts after depilation for the felt industry.

Japan

A SODIUM NITRITE FCATORY, with an annual capacity of 500 tons, is being constructed by Showa Hiryo K.K.

PRODUCTION OF CELLULOSE FROM MULBERRY TREE BARK will be commenced in 1937 by the Showa Rayon Company at its factories in Ibaragi and Fukushima. It is hoped to produce mulberry bark cellulose at 9 to 10 sen per lb., as against 13 to 14 sen for imported cellulose.

Czechoslovakia

OCHRE DEPOSITS IN THE STITNIK REGION of Slovakia are now being examined with a view to the possibility of industrial exploitation.

EXTENSIVE TALC DEPOSITS in the Sinec Mountain in Slovakia are to be exploited by a recently formed company headed by Dr. Szakall which hopes to develop an export trade to Poland after satisfying the home market.

Italy

IRON SALTS CAN BE COMPLETELY REMOVED from copper sulphate solution in the manufacture of cuprammonium rayon by treating with potassium permanganate in sufficient quantity to oxidise both the iron and any organic substances present. The process was developed in the research laboratories of the Bemberg S.A. at Gozzano and has been operating successfully for the last three years, 100 kilos of iron-free copper sulphate being recovered daily on the basis of the method described. Only 3 kilos of permanganate are consumed for each 100 kilos of copper and the loss of copper is less than 1 per cent. (Italian Patent 313,822.)

Russia

ACCORDING TO PUBLISHED STATISTICS in "Chemische Industrie," September 26, the 1935 production of synthetic rubber in Russia was for the first time on a sufficient scale to bring about an appreciable reduction in imports of natural rubber, and this tendency has been maintained in the first half of 1936. The actual import figures were 48,000 tons in 1934, 38,000 tons in 1935, and15,000 tons in the first half of 1936 (18,600 tons in the corresponding period of the previous year). In spite of the growth of the synthetic rubber industry, however, the quality of the product is by no means satisfactory. As reported in "Pravde," for example, no fewer than 100,000 synthetic rubber tyres produced last year proved entirely useless in practice.

ACTIVE CARBON IS USED IN HYDROCHLORIC ACID GAS PURIFICATION as elaborated by T. V. Polianski. The gas from crude acid obtained by reaction between sulphuric acid and sea-salt or that from commercial hydrochloric acid is first passed at ordinary temperature through a column packed with cold active carbon which retains iron and arsenical impurities. It then flows through an electric furnace (exit temperature of gas not less than 250° C.) likewise filled with active carbon where any sulphuric acid carried over is largely decomposed. To complete the elimination of sulphuric acid, the gas is finally passed through a vessel containing both active carbon and highly concentrated hydrochloric acid. No more than 500 grams active carbon are needed for a daily output of 50 kilos hydrochloric acid over a period of one month. The rate of passage of the gas through the electric furnace should not be more than about 2 c.c. per second. ("J. Khim. Prom," Vol. 12, No. 9, p. 924.)

Leather Trades' Chemists

Forthcoming Meeting of British Section

A MEETING of the British Section of the International Society of Leather Trades' Chemists will be held on October 8 at 10 a.m. in the Club Room over the Management Offices, Agricultural Hall, Islington, London, N.1. Papers to be read include "Tannin Considered from a Non-tanning Point of View," by Dr. C. Ainsworth Mitchell, F.I.C.; "Some Notes on the Analysis of Tanning Materials and the Use of Dry Chromed Hide Powder, together with the Darmstadt Apparatus," by Dr. J. Gordon Parker, F.I.C.; "A New Type of Colorimeter," by E. R. Bolton, F.I.C., M.I.Chem.E., and K. A. Williams, B.Sc., F.I.C.; "A Simple Method for Determining the Oily Matter in a Sulphated Oil," by Dr. D Burton, F.I.C., and G. F. Robertshaw, A.I.C.

All officers except the hon. treasurer retire at the end of the present year and are not eligible for, or do not desire, re-election. The vice-president, Dr. R. H. Marriott, becomes president under the Rules of the British Section. This leaves the following vacancies: Vice-president, secretary and two ordinary members of the committee. Nominations for election of any officer shall be made in writing on a form supplied by the hon. secretary and returned to him previous to October 31.

Personal Notes

DR. AND MRS. HERBERT LEVINSTEIN, of Sand Hill, Winslow, Bucks, now have a town address at 24 Chesterfield House.

MR. JOHN KINNEAR, for many years manager of the Alexandria Works of the United Turkey Red Co., Ltd., has died at Elmtree, Helensburgh, at the age of 77.

DR. D. MORGAN has been appointed secretary to the Safety in Mines Research Board in place of Mr. G. F. Anderson, who has been promoted.

MR. JAMES HENRY HOSEASON, F.C.S., one time assistant lecturer at Owens College, Manchester, died suddenly at his home, St. Michael's House, Hankham, Sussex, on September 22, aged 67.

MR. T. C. J. BURGESS, chairman and joint managing director of the London and Thames Haven Oil Wharves, Ltd., has been appointed chairman of the Irish National Refineries, Ltd., a new undertaking which has secured a big site for a refinery at Northwall, at the mouth of the River Liffey.

SIR ERNEST BENN will preside at the annual dinner and Convention Cruise reunion of the Advertising Association at Grosvenor House, London, on October 21. The speakers will include Sir Josiah Stamp, and among those supporting the president will be the Ambassadors of Denmark, Finland, Norway and Sweden, and Lord Leverhulme.

THE PRINCESS ROYAL will attend the opening next week of the Brotherton Library at the University of Leeds. The opening ceremony is to be performed by the Archbishop of Canterbury. The cost of building the Brotherton Library, which is to house the Brotherton collection of books and manuscripts, has been met out of the sum of £100,000 given by the late Lord Brotherton for that purpose.

THE Montecatini sodium cyanide plant at Crotone is already in production, and it is reported that the difficulties encountered in the preliminary production phases have been successfully overcome. Sodium is supplied by a plant that the Montecatini has had in operation for some months at Cesano Maderno. Sodium cyanide production at Crotone, however, is held up by insufficient supplies of sodium inasmuch as the Cesano output is utilised largely for other purposes. In order to meet this need the Montecatini is now putting up a sodium plant at Crotone.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the markets for general heavy chemicals, rubber chemicals, wood distillation products, perfumery chemicals and essential oils. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Steady price conditions have been reported this week in most sections of the Manchester chemical market and the general undertone is firm, with prospects of higher rather than lower rates. The probable outcome of currency devaluation on values of Continental materials is uncertain, but for the time being, at all events, there has been little change in the price position of these products compared with a week ago. In the meantime, deliveries of chemicals into consumption in Lancashire and West Yorkshire continue on a steady scale, but, for the most part, the movement is against contracts and no more than a moderate amount of actual new business has been reported during the past week. Among the by-products pitch is quiet, but in most other respects values are firm with a fair demand.

GLASGOW.—There was a lull in general trading at the beginning of the week caused by the Glasgow and district autumn holiday, but otherwise a steady tone has been maintained in coal tar by-products generally. Spot lots of benzole have been purchased round 1s. 3d. per gallon, and there has been a slight improvement in the demand for solvent and high flash naphthas. Most suppliers of cresylic acid still appear to be committed for some time ahead, and there is no report of any fresh long term contracts. A few minor transactions in 97/99 and American duty free grades have gone through without further advancement in price.

General Chemicals

ACETONE.—£62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, in 1 cwt. bags, £28; powdered, in 1 cwt. bags, £29.

ACID, CHROMIC.—Flaked, 10d. per lb., less 2½%; ground, 10¼d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 11¾d. to 1s. SCOTLAND: B.P. crystals, 11¾d. to 1s. per lb., less 5%.

ACID, CRESYLIC.—97/99%, 3s. to 3s. 1d. per gal.; pale, 98%, 3s. 1d. to 3s. 2d.; dark, 2s. 6d. to 2s. 7d.; 99/100%, refined, 3s. 4d. to 3s. 6d. per gal. MANCHESTER: 99/100%, pale, 3s. 7d.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. SCOTLAND: £2 10s. per cwt. in casks. MANCHESTER: £49 to £54 10s. per ton ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 11¾d. less 5%. MANCHESTER: 11¾d. to 1s. per lb.

ALUM.—SCOTLAND: Ground, £10 2s. 6d. per ton; lump, £9 12s. 6d.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £6 16s. per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 10s. ex store. MANCHESTER: White powdered Cornish £20 ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £11.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.a. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton in casks, special terms for contracts. SCOTLAND: £9.

BORAX COMMERCIAL.—Granulated, £14 10s. per ton; crystal £15 10s.; powdered, £16; finely powdered, £17; packed in **1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots. SCOTLAND: Granulated, £14 10s. per ton in 1 cwt. bags, carriage paid.**

CADMIUM SULPHIDE.—3s. 8d. to 3s. 11d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. SCOTLAND: £5 10s. per ton net ex store.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10½d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 18s. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LAMPBLACK.—£24 to £26 per ton.

LEAD ACETATE.—LONDON: White, £33 15s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £35, brown, £33 10s.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £32 10s. per ton less 2½%, carriage paid, for 2-ton lots.

LEAD, WHITE.—SCOTLAND: £40 per ton, carriage paid. LONDON: **£41.**

LITHOPONE.—30%, £16 to £16 5s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £6 17s. 6d. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. per lb. less 5% carriage paid. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 4¼d. per lb. MANCHESTER: £39 per ton.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. Crystals 8¾d. MANCHESTER: B.P. 10¼d. to 11¼d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 7½d. to 8d. per lb. SCOTLAND: 7¼d. net, ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £17 15s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: £12 10s. per ton in 1 cwt. kegs, £10 15s. per ton in 2 cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. SCOTLAND: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£29 per ton. SCOTLAND: £1 10s. per cwt.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5¼d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5¼d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b. SCOTLAND: £16 10s. per ton less 5%.

SULPHUR.—£9 to £9 5s. per ton. SCOTLAND: £8 to £9.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—October, £6 17s. 6d.; November, £6 19s.; December, £7 0s. 6d. for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.

CALCIUM CYANAMIDE.—October, £6 17s. 6d.; November, £6 18s. 9d.; December, £7; carriage paid to any railway station in Great Britain in lots of 4 tons and over.

NITRO-CHALK.—£7 5s. per ton to end of June, 1937.

NITRATE OF SODA.—£7 12s. 6d. per ton to end of June, 1937.

CONCENTRATED COMPLETE AND AMMONIUM PHOSPHATE FERTILISERS £10 12s. to £11 1s. per ton, according to specification. N.P. fertilisers £10 5s. to £13 15s. per ton for minimum 6-ton lots delivered buyer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 3s. 1d. to 3s. 2d. per gal.; 99/100%, 3s. 6d. to 4s. per gal., according to specification; pale 98%, 3s. 2d. to 3s. 3d.; dark, 2s. 9d. to 2s. 10d. GLASGOW: Pale, 99/100%, 2s. 9d. to 3s. 3d. per gal.; pale, 97/99%, 2s. 6d. to 2s. 9d.; dark, 97/99%, 2s. 3d. to 2s. 4d.; high boiling acids, 1s. 8d. to 2s.; American specification, 2s. 9d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7½d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal. MANCHESTER: Crystals, 6½d. to 6¾d. per lb.; crude, 2s. 7d. per gal. GLASGOW: Crude, 60's, 2s. 4d. to 2s. 6d. per gal.; distilled, 60's, 2s. 8d. to 3s.

BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2¼d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s. 3½d. GLASGOW: Crude, 8½d to 9d. per gal.; motor, 1s. 2d. to 1s. 3d.

CREOSOTE.—B.S.I. Specification standard, 5½d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North: 5d. London. MANCHESTER: 4¾d. to 5¼d. GLASGOW: B.S.I. Specification, 5¼d. to 5¾d. per gal.; washed oil, 4¼d. to 4¾d.; lower sp. gr. oils, 4¾d. to 5d.

NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 7d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW: Crude, 5½d. to 6d. per gal.; 90% 160, 1s. 4d. to 1s. 5d.; 90% 190, 1s. to 1s. 1d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £12 to £13 per ton; purified crystals, £22 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £7 to £8 per ton (bags free).

PYRIDINE.—90/140%, 6s. 6d. to 7s. 3d. per gal.; 90/180, 2s. 3d. GLASGOW: 90% 140, 6s. to 6s. 6d. per gal.; 90% 160, 5s. to 5s. 6d.; 90% 180, 2s. 6d.

TOLUOL.—90%, 1s. 11d. per gal.; pure, 2s. 3d. GLASGOW: 90% 120, 1s. 10d. to 1s. 11d. per gal.

XYLOL.—Commercial, 2s. 1d. per gal.; pure, 2s. 3d. GLASGOW: Commercial, 1s. 11d. to 2s. per gal.

PITCH.—Medium, soft, 35s. per ton, in bulk at makers' works. MANCHESTER: 32s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 30s. to 35s. per ton; in bulk for home trade, 32s. 6d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 to £8 10s. per ton; grey, £10 5s. to £10 15s. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.

CHARCOAL.—£5 to £10 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £45 to £48 per ton.

WOOD CREOSOTE.—Unrefined 6d. to 1s. 6d. per gal., according to boiling range.

WOOD, NAPHTHA, MISCIBLE.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 9d. per gal.

WOOD TAR.—£2 to £2 10s. per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

DINITROCHLORBENZENE, SOLID.—£72 per ton.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—In bags, £88 15s. per ton; in casks, £89 15s.

α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—9½d. to 11d. per lb.

p-TOLUIDINE.—1s. 11d. per lb.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, September 30.—LINSEED OIL was quiet. Spot, £26 15s. per ton (small quantities); Oct., £24 5s.; Nov.-Dec. and Jan.-April, £24 7s. 6d.; May-Aug., £24 10s., naked. SOYA BEAN OIL was inactive. Oriental (bulk), spot, Rotterdam, £24 5s. per ton. RAPE OIL was slow. Crude, extracted, £33 10s. per ton; technical refined, £34 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £28 per ton; refined common edible, £31 10s.; and deodorised, £33 10s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was steady. American, spot, 39s. per cwt.

HULL.—LINSEED OIL.—Spot, quoted £24 17s. 6d. per ton; Sept., £24 5s.; Oct.-Dec. and Jan.-April, £24 7s. 6d.; May-Aug., £24 10s. COTTON OIL.—Egyptian crude, spot, £30 per ton; edible, refined, spot, £32; technical, spot, £30; deodorised, £32, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £25 per ton, naked. GROUNDNUT OIL.—Extracted, spot, £34 per ton; deodorised, £37. RAPE OIL.—Extracted, spot, £32 10s.; refined, £33 10s. SOYA OIL.—Extracted, spot, £29 10s. per ton; deodorised, £32 10s. COD OIL.—F.o.r. or f.a.s., 25s. per cwt. in barrels. CASTOR OIL.—Pharmaceutical, 42s. per cwt.; first, 37s.; second, 35s. TURPENTINE.—American, spot, 41s. per cwt.

Books Received

The B.D.H. Book of Reagents for "Spot" Tests and Delicate Analysis. London: The British Drug Houses, Ltd. Pp. 96. 2s. 6d.

Chemical and Allied Stocks and Shares

THE stock and share markets have been active this week, largely owing to the devaluation of the franc and the belief that the measure of co-operation established between Britain, the United States and France to prevent any disorganisation of the foreign exchanges may perhaps do much to improve the outlook for world trade. This view has led to larger demand for shares of companies which are mainly engaged in international trade, it being contended that over a period they may have the best scope for appreciation in price, but it is, of cousre, realised that the upward movement in home trade is continuing and that it is likely to do so for a long time to come.

Imperial Chemical were again more active and have held up well, the price being virtually unchanged on the week at 40s. 9d. The market is continuing to take the view that the directors will no doubt again limit the dividend to 8 per cent., and place a large sum to reserve, but it is recognised that the shares give a larger yield than many other leading industrial shares and that the company would probably be one of the first to benefit from recovery in world trade. Salt Union lost a few pence to 43s., and B. Laporte, which are held firmly on continued hopes of another bonus in the future, remained at 130s. Imperial Smelting were again 15s. 9d., assisted by the hope of the resumption of dividends with a moderate payment. Burt, Boulton and Haywood were steady around 21s. 6d., aided by the larger dividend announced recently. Distillers were active and slightly higher on balance at 107s. 3d., and there was increased activity shown in Fison, Packard and Prentice, awaiting the dividend announcement, but the price has remained at 45s. British Glues were again 8s. 9d., and British Industrial Plastics 4s. Chloride Electrical Storage moved up from 96s. to 98s. 9d. on anticipations of a possible future bonus. Cooper, McDougall and Robertson were higher at 36s. 3d. and were very firm on the belief that the company's profits are likely to respond readily if there is satisfactory recovery in the Argentine and if the Argentine exchange position continues to improve.

Turner and Newall were in larger demand and have moved up on the week from 95s. 7½d. to 97s. 3d., the belief that the company will be assisted by less unsettled foreign exchanges having led to more general expectations of a good increase in dividend. United Molasses received increased attention for a similar reason. British Drug Houses is another company which will benefit from more stable foreign exchanges, as it does a considerable export business. The shares of the latter company remained steady at 19s. 6d., at which, as was mentioned last week, an apparently attractive yield is offered. Goodiass Wall and Lead Industries at 14s. 6d. have held their recent rise. Stewarts and Lloyds were steady, partly owing to the forthcoming dividend of Tube Investments, and partly because the prospect of increased competition in export markets from France may tend to increase the possibility of the international tube cartel being re-established. Dorman Long were higher at 40s. 9d., there being growing expectations of a resumption of dividends, although it is expected that a large proportion of the profits will again be placed back into the business.

Staveley Coal and Iron and Sheepbridge Coal and Iron shares remained relatively steady under the influence of the recently-issued results, and United Steel were higher on the excellent increase in the past year's profits. Elsewhere there was rather more interest in British Tar Products and Midland Tar Distillers on expectations that the dividends will be maintained at 15 per cent. and 5 per cent. respectively. Fluctuations were shown in Coal and Allied and Herbert Green shares. Petroleum Storage and Finance ordinary and deferred shares were again active. Wall Paper deferred stock units have reacted rather sharply, due to the possibility of increased competition from exports of wallpaper from the Continent now the franc has been devalued, but many market men continue to anticipate that the company will maintain its dividend at 12½ per cent. Unilever rose several shillings on hopes that more stable foreign exchanges will assist the company materially.

Oil shares have been active, awaiting the forthcoming dividend announcements. Burman Oil were good on hopes of a larger interim dividend (the announcement should have been made by the time these notes are read) and Shell continued to come in for request in anticipation of a resumption of interim dividend payments. Trinidad Leaseholds rose further on the good increase in profits disclosed by the full report. Anglo-Ecuadorian Oil and Apex (Trinidad) Oilfields are two other companies which are generally expected in the market to increase their dividends.

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Accepted with Date of Application

PURIFYING WASTE WATERS CONTAINING GREASE AND SOAP.—A. de Vreese. April 8, 1935. 453,285.

MANUFACTURE OF AZO DYESTUFFS CONTAINING METALS.—Coutts and Co. and F. Johnson (Legal representatives of J. Y. Johnson (deceased)) (I. G. Farbenindustrie). April 11, 1935. 453,365.

PRODUCTION OF RUBBER COMPOSITIONS.—R. K. Maclean. June 13, 1935. 453,299.

PRODUCTION OF NITROGEN OR OF A NITROGEN-HYDROGEN mixture from ammonia.—General Electric Co., Ltd., I. Jenkins and S. V. Williams. Aug. 23, 1935. 453,307.

RECOVERY OF SOLVENTS, MORE PARTICULARLY in the de-paraffination of hydrocarbon mixtures.—Edeleanu Ges. Jan. 18, 1935. 453,325.

DISTILLATION TREATMENT OF MATERIALS CONTAINING HYDROCARBONS.—J. Swallow, C. J. Greenstreet and E. W. Brocklebank. March 16, 1936. 453,265.

PROCESS FOR OBTAINING BEE VENOM.—F. Hoffmann-La Roche and Co., A.-G. April 25, 1935. 453,407.

MANUFACTURE OF PIPERIDINE PENTAMETHYLENEDITHIOCARBAMATE, and the treatment of benzole forerunnings.—Yorkshire Tar Distillers, Ltd., and J. S. Belford. March 28, 1936. 453,340.

PREPARATION OF CHLORINE-SUBSTITUTED BUTANES.—Consortium Für Elektro-Chemische Industrie Ges. June 19, 1935. 453,414.

Applications for Patents

(September 10 to 16 inclusive.)

PROCESS FOR RECOVERING COPPER FROM WASTE LIQUORS of artificial silk industry.—I. G. Farbenindustrie. (Germany, Nov. 23, '35.) 25218.

DISTILLATION OF CARBONACEOUS MATERIALS.—National Coke and Oil Co., Ltd. 24913.

PRODUCTION OF PETROL BY HYDROGENATION.—F. Puening. 25148.

TREATMENT OF ARSENICAL PYRITES, ETC.—R. Sibille. 25121.

DISTILLATION OF CARBONACEOUS MATERIALS.—J. L. Strevens. 24913.

PRODUCTION OF TITANIUM COMPOUNDS.—Titan Co., Inc. (Germany, Sept. 14, '35.) 24732.

PURIFICATION OF META-PHOSPHATES.—W. W. Triggs (Rumford Chemical Works). 25197.

DETERGENTS.—W. W. Triggs (Rumford Chemical Works). 25198.

RECOVERY OF TANTALUM AND NIOBIUM.—W. W. Triggs (Soc. Générale Metallurgique de Hoboken). 24687.

(September 17 to 23 inclusive.)

PRODUCTION OF POLYMERISATION PRODUCTS FROM ACETYLENE.—Ammonia Casale Soc. Anon. (Italy, Nov. 9, '35.) 25337.

TREATMENT OF GASES, SOLIDS, OR LIQUIDS to produce physical or chemical changes.—S. C. Blacktin. 25395.

ELECTROLYTIC DEPOSIT.—Bozel-Maletra Soc. Industrielle de Produits Chimiques. (France, Oct. 2, '35.) 25356.

COATING-COMPOSITIONS.—E. I. du Pont de Nemours & Co. 25373.

PRODUCTION OF RESINOUS COMPOSITIONS.—E. I. du Pont de Nemours and Co. 25749, 25750.

MANUFACTURE OF AZO DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie). 25427.

TREATMENT OF HIDES.—W. W. Groves (I. G. Farbenindustrie). (Jan. 21, '35.) 25628.

MANUFACTURE OF AROMATIC COMPOUNDS ALKYLATED IN NUCLEUS. W. W. Groves (I. G. Farbenindustrie). 25738.

MANUFACTURE OF ARTIFICIAL FIBRES RESEMBLING WOOL.—W. W. Groves (I. G. Farbenindustrie). 25739.

PRODUCTION OF COLOUR FILMS.—W. W. Groves (I. G. Farbenindustrie). 25740.

MANUFACTURE OF DERIVATIVES OF A-OXY-NAPHTHOIC ACID.—W. W. Groves (I. G. Farbenindustrie). 25741.

MANUFACTURE OF ANTHRAQUINONE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 25838.

MANUFACTURE OF VANILLIN from waste sulphite pulp liquor.—H. Hibbert, G. H. Tomlinson. 25470.

MANUFACTURE OF DYESTUFFS.—I. G. Farbenindustrie. (Germany, Sept. 21, '35.) 25540.

MANUFACTURE OF MONOAZO DYESTUFFS.—I. G. Farbenindustrie. (Germany, Sept. 21, '35.) 25623.

MANUFACTURE OF DYESTUFFS.—I. G. Farbenindustrie. (Germany, Oct. 4, '35.) 25839.

ANTHRAQUINONE DYESTUFFS.—Imperial Chemical Industries, Ltd., W. W. Tatum. 25370.

POLYMERISED OLEFINES.—Imperial Chemical Industries, Ltd., M. W. Perrin and E. G. Williams. 25372.

PRODUCTION OF STIGMASTEROL.—Imperial Chemical Industries, Ltd., E. W. Fawcett and J. R. Myles. 25748.

BRIGHT-DIPPING OF ELECTRO-DEPOSITED ZINC COATINGS.—Imperial Chemical Industries, Ltd. (Du Pont de Nemours and Co.). 25751.

MANUFACTURE, ETC., OF BUTADIENE.—G. W. Johnson (I. G. Farbenindustrie.) 25625, 25626.

VALVE CONTROL SYSTEMS.—Manlove, Alliott, and Co., Ltd. 25323.

STERILISERS.—Manlove, Alliott and Co., Ltd. 25627.

RECOVERING SULPHURIC ACID from sulphuric acid solutions of sulphates.—E. Mantius, O. Mantius. (United States, Nov. 22, '35.) 25553.

PREVENTION OF CORROSION.—R. W. Moncrieff. 25533.

APPLICATION, ETC., OF DETERGENT COMPOSITIONS.—Rumford Chemical Works. (United States, Oct. 5, '35.) 25413, 25414.

PRODUCTION OF GLUTAMIC ACID, ETC.—J. Schindelmeier. 25566.

MANUFACTURE OF ESTERS.—Soc. of Chemical Industry in Basle. (Switzerland, Oct. 5, '35.) 25317; (Switzerland, June 13.) 25318; (Switzerland, July 28.) 25319.

PRODUCTION OF TITANIUM-DIOXIDE PIGMENTS.—W. J. Tennant (Titan Co.). 25478.

From Week to Week

BRITISH SUMMER TIME ends at 2 a.m. to-morrow (Sunday). All clocks should be put back one hour to-night.

THE LONDON TELEPHONE NUMBER of Lovering Chnia Clays is now Mansion House 5488.

BOWRING, JONES AND TIDY, LTD., suppliers of rosin and turpentine, 20 Castle Street, Liverpool, 2, notify a change of address to 204 India Buildings, Water Street, Liverpool, 2, as from October 5. There will be no alteration in the telegraphic address or telephone number.

A REPRESENTATION HAS BEEN MADE to the Board of Trade under Section 10(5) of the Finance Act, 1926, regarding Isopropylbarbituric acid. Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, within one month from September 29, 1936.

TWO HUNDRED BELFAST CHEMICAL WORKERS are to receive a wage increase of 3s. per week. This decision was announced following negotiations between Mr. W. McMullan, representing the Irish Transport and General Workers' Union, and the management of Richardson's Chemical Manure Co., Short Strand, Belfast. The new agreement, which comes into force in October, will remain in operation for twelve months.

THE UNIVERSITY OF SHEFFIELD has launched an appeal for £250,000, to enable it to extend its accommodation and equipment. At least £450,000 will be needed for the whole scheme to be completed, but the lesser sum is urgently required, says the appeal, if the University is not to fall behind others in the fulfilment of its primary duties of teaching and research. Already £50,000 has been contributed, and this includes the gift of £10,000 from Sir Robert Hadfield, who is a member of the council of the University.

THE NEW SOAP WORKS AT SUTTON, CO. DUBLIN, which is destined to prove of considerable benefit to the locality, employing eventually, it is stated, some fifty hands, will be ready for production about the middle of October. A coap cleanser, particularly adapted to the washing of dairy utensils, will be manufactured in addition to the usual range of coaps. The prime mover in the establishment of the concern is Mr. T. Brayden, who is associated with the firm of McCormack and Co., soap manufacturers, Talbot Street, Dublin, and who will be the manager of the enterprise.

NOBEL'S EXPLOSIVES FACTORY at Linlithgow is to be reopened. The factory was closed down last April on the transfer of the manufacturing interests to Ardeer. Imperial Chemical Industries, Ltd., now announce their intention of resuming operations in West Lothian. It is understood that contracts have been placed by Nobel's, Ltd., for extensive alterations to the premises, and some months may elapse before these are completed. The factory was opened in 1903 and had been Linlithgow's staple place of employment until the spring of this year, when it closed down. Over 200 people were employed and the majority have since been idle.

CHANGE OF ADDRESS AND TELEPHONE NUMBER is announced for the National Federation of Associated Paint, Colour and Varnish Manufacturers of the United Kingdom, the Research Association of British Paint, Colour and Varnish Manufacturers; the National Joint Industrial Council of the Paint, Colour and Varnish Industry; the London Colour, Paint and Varnish Manufacturers' Association; the Paint Marketing Council; the Paint Trade Benevolent Fund; the Paint Materials Trade Association; the British Colour Makers' Association; the Association of Cellulose Lacquer Manufacturers and Tung Oil Estates, Ltd. The offices of these organisations have been moved to the South Wing of the present building and their registered address is now Tavistock House (South), Tavistock Square, London, W.C.1. Telegraphic address: Paicolvar, Westcent, London; Telephone number: Euston 2573/4.

CLAYTON, SON AND CO., LTD., have moved their London office to Abbey House, 2 Victoria Street, Westminster, S.W.1, as from September 25.

THE TRUSTEES FOR THE DEBENTURE HOLDERS of Herbert Green and Co., Ltd., at East Holton, Lincolnshire, have appointed a member of the firm of Price, Waterhouse and Co. as receiver for the company. It is understood that the directors will issue a statement to shareholders "very shortly."

A DISTINGUISHED COMPANY OF SCIENTISTS interested in the production of wool visited Torridon, the headquarters of the Wool Industries Research Association, Leeds, on September 24. They were Empire delegates attending the Agricultural Scientific Research Conference in London.

A NEW TYPE OF INSULIN, based on a discovery made by Dr. D. A. Scott, of Connaught Laboratories, Toronto, is now being used extensively with success in Toronto and Montreal hospitals. Dr. Scott's discovery involves adding infinitely small quantities of zinc chloride to insulin which increases the sensitivity of diabetics to injected insulin.

THE IMPORT DUTIES ADVISORY COMMITTEE give notice of an application for addition to the free list of ferro-silicon containing from 20 to 35 per cent. of silicon. Any representations which interested parties may desire to make in regard to these applications should be addressed in writing to the Secretary, Import Duties Advisory Committee, Shell-Mex House, Strand, London, W.C.2, not later than October 22.

THE LARGEST QUARRY BLAST EVER CARRIED OUT in the British Isles took place at the Llysfaien limestone quarries, owned by Imperial Chemical Industries, Ltd., near Abergele, North Wales, on September 26. Preparations had been going on for the past twelve months, and for the last fortnight men have been engaged in carrying the twenty-four tons of powder needed to fire the five fifty-foot tunnels made upon the face of the quarry. Lord Colwyn fired the blast and more than 250,000 tons of rock was dislodged.

SHARE AND DEBENTURE HOLDERS of the Lautaro Nitrate Co., Ltd., at special meetings on September 24, approved the scheme for the financial reconstruction of the company. It is stated that for the year to June 30, 1936, the company earned a profit available for distribution to bondholders and banker creditors of about £300,000, and profits still continue to be earned at about that same rate, but the industry is so hedged about by tariffs, quotas and exchange difficulties that it would be quite impossible to make any forecast as to future profits.

S. HUBBARD, LTD., wool and fur felt body manufacturers, Regent Street Dye Works, Luton, Beds., have issued a 1937 Spring and Summer Colour Card from their bleaching and dyeing department, and also a Ribbon Colour Card in co-operation with Oakley and Jennings. Both of these colour cards are issued in co-operation with the British Colour Council, the forty-one colours having been passed by them as agreeing with the seasonal standards to which they refer. Five thousand colour cards dyed to the seasonal standards of the British Colour Council were issued for Autumn, 1936.

BRITISH, CONTINENTAL AND AMERICAN SCIENTISTS attended the annual conference of the Faraday Society, which was held in the Chemistry Theatre of Edinburgh University, and for the first time in Scotland, last week. The Society exists for the promotion of the study of electrochemistry, electrometallurgy, physical chemistry, and kindred subjects. The distinguished men who attended included Professor J. H. Hildebrand, California; Professor V. Henri, Liege; Professor J. A. Prins, Holland; Professor F. London, Paris; and Professor J. Errera, Brussels. In the absence of Principal Sir Thomas Holland, Professor James P. Kendall, of the Chair of Chemistry at Edinburgh University, welcomed the members to Edinburgh. After the overseas guests had been welcomed, the meeting proceeded to discuss the subject of the conference, "Structure and Molecular Forces in Pure Liquids and Solutions." Theories rather than definite facts were discussed and the conference "groped scientifically" rather than worked towards definite conclusions.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

C. BENNETT & C., LTD., London, E., manufacturing chemists. (M., 3/10/36.) September 16, £500 debentures; general charge.

ELEPHANT CHEMICAL CO., LTD., London, S.E. (M., 3/10/36.) September 17, £7,500 debentures, to M. E. Ricketts, Harold Wood; general charge. *£1,250. July 3, 1936.

Satisfactions

BRITISH SUGAR MANUFACTURERS, LTD., London, E.C. (M.S., 3/10/36.) Satisfactions September 16, of debentures registered November 11, 1925, September 15, 1926, and February 12, 1932, in full.

LAFARGE ALUMINOUS CEMENT CO., LTD., London, W.C. (M.S., 3/10/36.) Satisfaction September 16, of Trust Deed registered January 6, 1926.

Company News

Eastwoods Lewes Cement, Ltd.—A final dividend is announced on the ordinary and founders' shares in respect of the year ended June 30, 1936, of 8½ per cent., making 12½ per cent. for the year. The dividend will be paid on October 12 to members registered before the closing of the share transfer books on September 24.

Glenboig Union Fire-Clay.—No final dividend has been recommended (no dividend paid since 2½ per cent. for the year 1929-30). The company has now become a subsidiary of General Refractories, and accounts have been prepared to December to coincide with parent Company's financial year.

Newton Chambers and Co., Ltd.—The company has doubled its interim dividend on the £465,960 ordinary shares at 5 per cent., less tax, payable on October 15. The directors also announce the half-yearly distribution on the £146,960 6 per cent. cumulative participating preference shares.

North Broken Hill, Ltd.—The net profit of the company for the year ended June 30, 1936, amounts to £636,940 after providing for depreciation, taxation, and royalties. In the previous year £149,966 was deducted for taxes, royalties, and depreciation, leaving a net balance of £390,684.

Broken Hill Proprietary.—It is announced that coupon No. 32 of 7 per cent. "B" series debentures will be paid on or after October 1 at Commonwealth Bank of Australia, 8 Old Jewry, E.C.2. Coupons presented at London branch will be paid in Australian currency converted for convenience of holders into sterling at rate of exchange current in London October 1.

Thos. Firth and John Brown, Ltd.—An interim dividend has been declared of 5 per cent., tax free, payable on October 15, to shareholders registered on October 3. This is the first interim payment for many years. For the whole of 1935 12½ per cent., tax free, was paid, against 5 per cent. for 1934. Last November the capital was increased from £2,450,000 to £2,550,000 by the creation and issue of 100,000 additional "A" ordinary £1 shares. These new shares rank for the dividend now declared.

Murex, Ltd.—The directors have decided to recommend a final dividend on the ordinary shares of 3s. per share, less tax at 4s. 9d. in the £, making 5s. per share for the year ended June 30 last, payable on October 16, to shareholders registered on October 1, 1936. The total dividend is equal to 25 per cent., and is payable on the increased capital resulting from the 2½ per cent. capital bonus distributed last year. The total 1934-35 dividend was 20 per cent. on the £540,000 of ordinary capital then ranking.

Explosives and Chemical Products.—The net profit for the year ended June last, after providing for depreciation, taxation and contingencies, and for remuneration of directors, was £16,210 (£15,939), and £32,882 was brought in, making £49,092. The directors recommend a dividend on ordinary at the rate of 16⅔ per cent., tax free (same), in proportion to amounts paid up, and a dividend on deferred of 5.99203d. per share, tax free (5.9124d. per share). These dividends absorb £10,152, leaving £38,940 to carry forward. Meeting, Finsbury Pavement House, Moorgate, E.C., October 7, at 12 noon.

New Companies Registered

Gypsum Industries and Products, Ltd., 15 Regent Street, London, W.1.—Registered September 28. Nominal capital, £100. Manufacturers of and dealers in stone and artificial stone, bricks, tiles and pipes and in particular, manufacturers of gyproc wall boards and all combinations having gypsum as a basis of or ingredients in their production, manufacturers of and dealers in building products and materials, chemical products, etc. Directors: Rolf H. Stein, Cecil G. Hayman.

Britanol, Ltd.—Registered September 22. Nominal capital, £600. Manufacturers of and dealers in dyes, colours, pigments, paints, stains, finishes and varnish, tanners, manufacturers of tanning materials and leather and leather substitutes, suppliers of tanners' accessories, curriers, etc. Directors:—Maurice G. White, the Nook, Burley-in-Wharfedale, Yorks; and Alfred J. Guberan.

Forthcoming Events

LONDON.

Oct. 5.—Society of Chemical Industry (London Section). "The Chemical Aspects of Dermatitis." Chairman's Address. Dr. H. E. Cox. 8 p.m. Burlington House, London.

Oct. 6.—The Sir John Cass Technical Institute. Inaugural Ceremony—Session 1936-37. 8.15 p.m. Address by Bishop H. L. Paget. Jewry Street, Aldgate, London.

Oct. 7.—Pharmaceutical Society of Great Britain. Opening of 95th Session and presentation of the Hanbury Medal and Prizes. Inaugural sessional address by Frank Lee Pyman. 3 p.m. London.

Oct. 7.—Society of Public Analysts. 8 p.m. Burlington House, Piccadilly, London.

Oct. 8.—International Society of Leather Trades' Chemists (British Section). "Tannin Considered from a Non-tanning Point of View." Dr. C. Ainsworth Mitchell; "Some Notes on the Analysis of Tanning Materials and the Use of Dry Chromed Hide Powder, together with the Darmstadt Apparatus." Dr. J. Gordon Parker. "A New Type of Colorimeter." E. R. Bolton, K. A. Williams. "A Simple Method for Determining the Oily Matter in a Sulphated Oil." Dr. D. Burton and G. F. Robertshaw. 10 a.m. Agricultural Hall, Islington, London.

Oct. 8.—The Institute of Vitreous Enamellers (Southern Section). "Design of Metal and Cast Iron Parts for Vitreous Enamelling." J. H. Coupe. 8 p.m. British Industries House, Marble Arch, London.

BRISTOL.

Oct. 8.—Society of Chemical Industry (Bristol Section). "Boiler Feed Water Conditioning." P. Hamer. 7.30 p.m. University Chemical Department (Woodland Road), Bristol.

GRANGEMOUTH.

Oct. 5.—Institute of Chemistry and Society of Chemical Industry (Edinburgh and East of Scotland Sections). "Cellulose and Related Carbohydrates." Professor W. N. Haworth. 7.15 p.m. Scottish Dyes Recreation Club Hall, Grangemouth.

MANCHESTER.

Oct. 2.—Society of Chemical Industry (Manchester Section). "Synthesis of Aliphatic Acids under High Pressure." Dr. D. V. N. Hardy. 7 p.m. Constitutional Club, St. Ann Street, Manchester.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., patent and trade mark agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Liquor Carbonis Detergens. 563,609. An alcoholic solution of coal tar for veterinary and sanitary purposes. Wright, Layman and Umney, Ltd., 44 to 50 Southwark Street, London, S.E.1. October 16, 1935.

Cail. 563,200. Raw, or partly prepared, vegetable, animal, and mineral substances used in manufacture, not included in other classes. Coal and Allied Industries, Ltd., 14 Leadenhall Street, London, E.C.3. September 27, 1935.

Solhow. 563,185. Alcohol (other than ordinary or ethyl) for ust in manufactures and alcohol for use in scientific research. John William Howlett and Emanuel Solomon, 20 Angell Road, Brixton, London, S.W.9. September 27, 1935.

Latekoll. 562,597. All goods included in Class 4, but not including vegetable oils and not including any goods of a like kind to vegetable oils. I. G. Farbenindustrie-Aktiengesellschaft, Grüneburgplatz, Frankfurt-on-the-Main 20, Germany. August 30, 1935. Address for Service in the United Kingdom is, c/o Albert A. Mond and Thiemann, 19 Southampton Buildings, Chancery Lane, London W.C.2.